SALMON RIVER MOOSE CENSUS-OCTOBER 1997

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INTRODUCTION

Moose management in Unit 23 has been a high priority issue for land managers since Unit 23 moose populations declined following two consecutive severe winters in 1990 and 1991. The area within Kobuk Valley National Park (KVNP) is closed to sport hunting. Most local harvest occurs close to local villages such as Kiana, Noorvik, and Ambler or along the Kobuk River corridor via boat and snow machine access. Harvest is assumed to play a minor role in limiting moose abundance in this area. With this in mind, monitoring this population will provide data that serve as a comparison for more heavily harvested drainages within northwestern Alaska such as the Noatak, Squirrel, and Tagagawik Rivers. The latter areas have been delineated into long-term quantitative monitoring sites for moose abundance. Prior to 1995, only trend counts had been conducted in the Middle Kobuk River valley. A census area was delineated subjectively to meet the objectives of a logistically feasible and cost effective census area that could be surveyed every 2-3 years to obtain statistically valid composition and abundance estimates. We chose a survey area encompassing the eastern side of the Kallarichuk Hills, Salmon River, Tutuksuk River, and Kobuk River (Fig. 1). We selected an area small enough to complete a census using local agency personnel, agency aircraft/pilots, and local charter operators within the constraints of limited fall daylight and favorable weather.

METHODS

We conducted a stratified random sample survey using the methods of Gasaway et al. (1986). We stratified the census area using a Cessna 185 (NPS) with 3 observers. Sample units were surveyed using 4 PA-18 Super Cubs (2-Charter, 2-Agency) and 1 American Champion Scout (NPS). Population parameters were estimated using the computer program MOOSEPOP with 2 strata specified (DeLong and Reed, no date).

RESULTS

We conducted the census between 21 October and 28 October 1997. We stratified the census area on 21 and 22 October in 7 flight hours. Weather conditions prevented flights on 23 and 25 October, but were otherwise optimal (i.e. clear sky, light wind, and complete snow cover). Sample units were surveyed in approximately 36 flight hours. Participants in the survey were agency personnel with prior moose survey experience.

Stratification and Sample Units

We surveyed 31 of 70 units (44%; area=397 mi^2 (1,027 km^2)) and completed intensive surveys for sightability correction factors in 19 units (Table 1). The mean standard search intensity was 5.4 min/mi^2 (2.1 min/km^2). The sightability estimate was 77%. The 891 mi^2 (2,309 km^2) census area was stratified as 52 low (74%) and 18 (26%) high density units.

Population Estimation and Composition

MOOSEPOP population estimates and composition estimates are summarized in Tables 2-7. The population estimate of 1,023 moose (80% CI ± 17%) results in a density estimate of 1.1 moose/mi^2 (1.0 moose/km^2)(Table 2). We counted 627 moose classified as 189 bulls, 357 cows, and 81 calves. Bull, cow, and calf estimates were 335, 560, and 129 respectively (Tables 3, 4, and 5). The estimated bull:cow ratio was 60:100 (80% CI ± 10%), and the estimated calf:cow ratio was 23:100 (80% CI ± 19%)(Tables 6 and 7). Bull antler size classes were estimated to be 30% small, 37% medium, and 33% large.

DISCUSSION

The 1997 survey was more precise than the 1995 census which was compromised by the low number of moose actually counted and the low sightability estimate. Moose sightability was low again for the 1997. Low sightability will probably be the norm for Kobuk valley when compared to the Noatak and Squirrel census areas because a large proportion of the survey area is covered by spruce forest. Differences between the resulting ratio estimates from both surveys is most likely attributed to sampling variance than real changes in population composition and abundance between 1995 and 1997. The bull:cow ratio reflects the lack of a significant harvest effect and is 38% higher than the Noatak river population. The cow:calf ratio is near the long-term mean for the Noatak and Squirrel river moose census areas. Similar to other areas, only five sets of twins were observed during the survey.

The survey will be conducted again during fall 2000. Survey cost for 1997 was nearly $15,000.

LITERATURE CITED

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Table 1. Sample unit data for the Salmon River moose census, October 1997.

		Time	Area	Bull[a]			Cow[b]				SCF[c]	
Unit	Stratum	(min)	(mi^2)	S	M	L	0	1	2	Total	S	I
33	Low	67	14.80	0	0	3	4	1	0	9	1	1
34	High	80	14.60	0	9	3	6	3	1	27	8	8
41	Low	54	13.40	0	0	0	0	0	0	0		
66	Low	81	14.90	1	1	0	4	2	0	10	10	12
3	Low	95	11.90	0	1	1	0	1	0	4	0	3
14	Low	62	15.00	6	7	1	14	0	0	28	21	25
58	Low	58	14.10	0	0	0	0	0	0	0		
61	Low	66	12.00	0	0	0	0	0	0	0		
65	High	66	15.10	0	1	3	2	1	0	8	0	0
7	Low	90	12.50	2	0	0	0	3	0	8	4	4
52	Low	50	13.00	0	0	0	0	0	0	0	0	0
17	High	41	10.80	0	0	7	18	4	0	33	2	2
12	High	72	14.80	2	5	8	35	2	0	54	5	7
10	High	59	14.80	2	2	2	11	3	0	23		
60	High	67	13.30	3	7	6	33	18	1	88	18	19
59	High	62	13.70	4	6	3	22	10	0	55	6	8
57	High	47	10.30	0	1	1	9	3	0	17	11	11
50	Low	34	11.40	2	1	0	1	1	0	6		
53	Low	46	11.70	0	0	0	0	0	0	0		
70	High	68	10.40	2	2	2	2	2	0	12		
67	High	55	10.30	0	0	1	3	1	0	6	1	3
36	High	148	12.80	2	7	6	16	4	0	39		
40	High	85	12.20	0	0	1	1	0	2	8	4	4
9	High	75	13.00	1	6	7	15	2	1	36	0	3
13	High	93	12.20	4	3	5	12	6	0	36	6	9
15	High	80	9.40	5	3	7	26	2	0	45	10	14
48	Low	67	13.00	2	0	0	2	0	0	4		
25	High	103	13.20	2	6	4	12	0	0	24	1	1
23	High	62	12.30	0	0	3	15	0	0	18		
20	High	53	15.80	2	3	2	18	2	0	29		
39	Low	58	9.80	0	0	0	0	0	0	0		

[a] Bull antler size classes: S=small (<25 in), M=medium (26-50 in), and L=large (>50 in)
[b] Cow associations: 0=no calf, 1=1 calf, 2=2 calves.
[c] Sightability Correction Factor (SCF); "S" is the number of moose sighted during the standard search and "I" is the number of moose counted in the same area during the intensive search

Table 2. MOOSEPOP results showing estimated population size, density, sightability, and precision for the Salmon River moose census, October 1997.

PAR/STRAT	low	high	TOTAL
N	52	18	70
Tot area	662.40	229.00	891.40
N	13	18	31
Area sur	167.50	229.00	396.50
# seen	69	558	627
Density	0.4119	2.4367	0.9321
To	272.9	558.0	830.9
V(To)	8498.56	0.00	8498.56
To df	12	17	12

SCFo=1.23118 V(SCFo)=0.0045618294 df(SCFo)= 18
Te= **1023.0** V(Te)= 15992.71 df(Te)= 12

80% CI around Te = (851.5, 1194.4) is +/- 16.76%
90% CI around Te = (797.6, 1248.3) is +/- 22.03%
95% CI around Te = (747.4, 1298.5) is +/- 26.94%

Moose Density = 1023.0/891.4 mi^2 = 1.15 moose/mi^2

Table 3. Bull moose estimates calculated by MOOSEPOP, Salmon River moose census, October 1997.

PAR/STRAT	low	high	TOTAL
N	52	18	70
Tot area	662.40	229.00	891.40
N	13	18	31
Area sur	167.50	229.00	396.50
# seen	28	161	189
Density	0.1672	0.7031	0.3048
Wen	110.7	161.0	271.7
V(Wen)	2028.76	0.00	2028.76
Df	12	17	12

SCFo=1.23118 V(SCFo)=0.0045618294 df(SCFo)= 18
Wen= 334.5 V(Wen)= 3402.80 df(Wen)= 12

80% CI around Wen = (255.4, 413.6) is +/- 23.64%
90% CI around Wen = (230.6, 438.5) is +/- 31.07%
95% CI around Wen = (207.4, 461.7) is +/- 37.99%

Table 4. Cow moose estimates calculated by MOOSEPOP, Salmon River moose census, October 1997.

PAR/STRAT	low	high	TOTAL
N	52	18	70
Tot area	662.40	229.00	891.40
N	13	18	31
Area sur	167.50	229.00	396.50
# seen	33	324	357
Density	0.1970	1.4148	0.5099
Wen	130.5	324.0	454.5
V(Wen)	2211.87	0.00	2211.87
Df	12	17	12

SCFo=1.23118 V(SCFo)=0.0045618294 df(SCFo)= 18
Wen= 559.6 V(Wen)= 4285.04 df(Wen)= 12

80% CI around Wen = (470.8, 648.3) is +/- 15.86%
90% CI around Wen = (442.9, 676.2) is +/- 20.85%
95% CI around Wen = (416.9, 702.2) is +/- 25.49%

Table 5. Calf moose estimates calculated by MOOSEPOP, Salmon River moose census, October 1997.

PAR/STRAT	low	high	TOTAL
N	52	18	70
Tot area	662.40	229.00	891.40
N	13	18	31
Area sur	167.50	229.00	396.50
# seen	8	73	81
Density	0.0478	0.3188	0.1174
Wen	31.6	73.0	104.6
V(Wen)	138.77	0.00	138.77
Df	12	17	12

SCFo=1.23118 V(SCFo)=0.0045618294 df(SCFo)= 18
Wen= 128.8 V(Wen)= 259.67 df(Wen)= 12

80% CI around Wen = (107.0, 150.7) is +/- 16.96%
90% CI around Wen = (100.1, 157.5) is +/- 22.29%
95% CI around Wen = (93.7, 163.9) is +/- 27.26%

Table 6. Bull:Cow ratios calculated by MOOSEPOP, Salmon River moose census, October 1997.

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p= 0.5979 V(p)= 0.00212049 df(p)= 12

80% CI around p = (0.5354, 0.6603) is +/- 10.44%
90% CI around p = (0.5158, 0.6799) is +/- 13.73%
95% CI around p = (0.4975, 0.6982) is +/- 16.78%

Table 7. Calf:Cow ratios calculated by MOOSEPOP, Salmon River moose census, October 1997.

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p= 0.2302 V(p)= 0.00106113 df(p)= 12

80% CI around p = (0.1861, 0.2744) is +/- 19.19%
90% CI around p = (0.1722, 0.2883) is +/- 25.21%
95% CI around p = (0.1592, 0.3012) is +/- 30.83%
